

**Abstract**

5 Isothermal process for the dehydrogenation of alkanes to the corresponding alkenes over a catalyst bed comprising a dehydrogenation-active catalyst, wherein the catalyst bed comprises a catalytically inactive, inert diluent material. The catalytically inactive, inert diluent material is preferably selected from the group consisting of the oxides of the elements of main groups II, III and IV, transition groups III and IV and V, mixtures thereof and nitrides and carbides of elements of main groups III and IV and preferably has a BET surface area of  $< 10 \text{ m}^2/\text{g}$ .

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The presence of the catalytically inactive diluent material in the catalyst bed limits the space-time yield, based on alkene formed to preferably  $7.0 \text{ kg}/(\text{kg}_{\text{bed}} \times \text{h})$ .